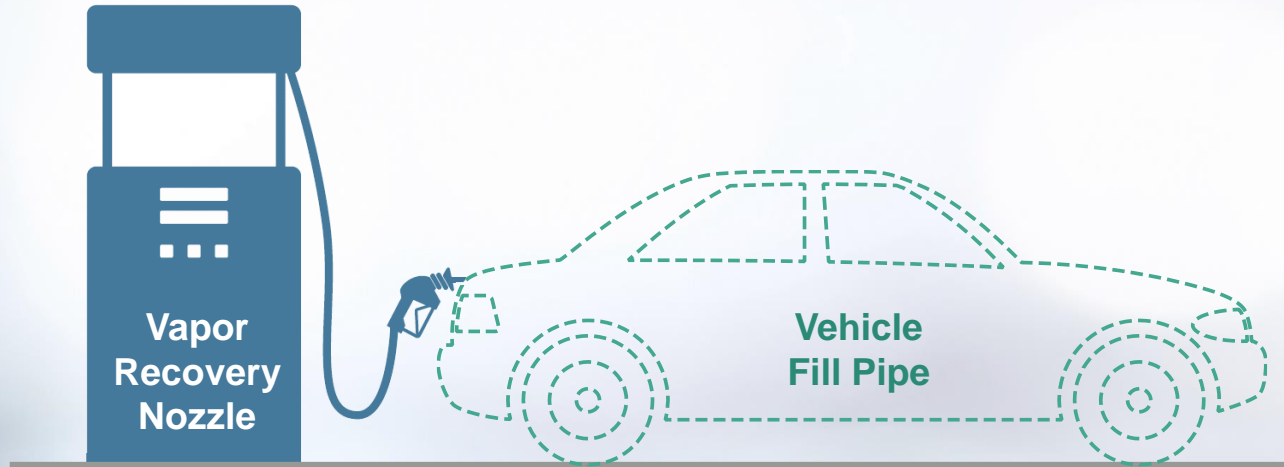




**Proposed Amendments to Enhanced Vapor Recovery
Regulations to Standardize Gas Station Nozzle Spout
Dimensions to Help Address Storage Tank Overpressure**

October 25, 2018



Ongoing Need for Vapor Recovery

Reduce ozone & benzene



**California Today:
15 billion gallons gasoline/year**



California's Vapor Recovery Program

Bulk
Plants /
Terminals



Cargo
Tanks



Gas
Stations
Phase I
Vapor Recovery

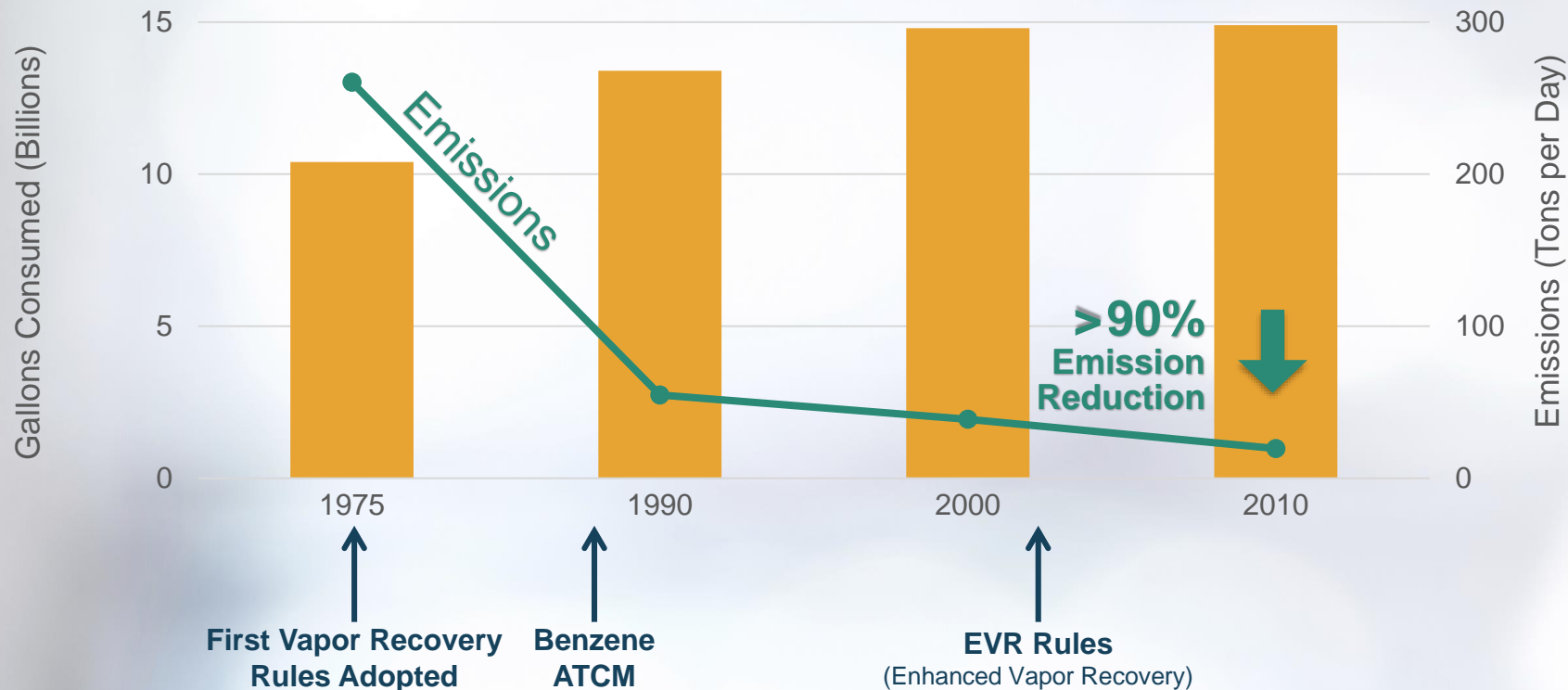


Dispensing
to Vehicles
Phase II
Vapor Recovery



Reducing Gasoline Emissions

Gasoline Consumption Increase of ~50%



Success Through Collaboration

CARB

- Establish performance standards
- Develop test procedures
- Certify new equipment and control technologies
- Quantify emissions and reductions

Air Districts

- Implement and enforce rules
- Permit and inspect gas stations
- Provide data to CARB

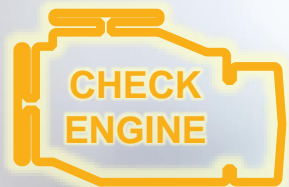
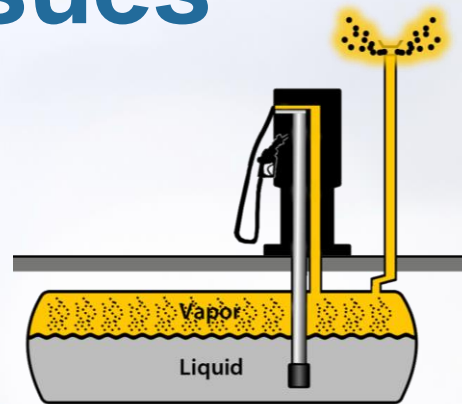
Industry

- Develop innovative control technologies
- Install, operate, and maintain control systems

Overpressure Issues

1. Emission increases in winter

- Benzene emissions:
Potential near source health risk concerns at some sites



2. In Station Diagnostic System alarm response costs when no equipment malfunctions



What Causes Overpressure?

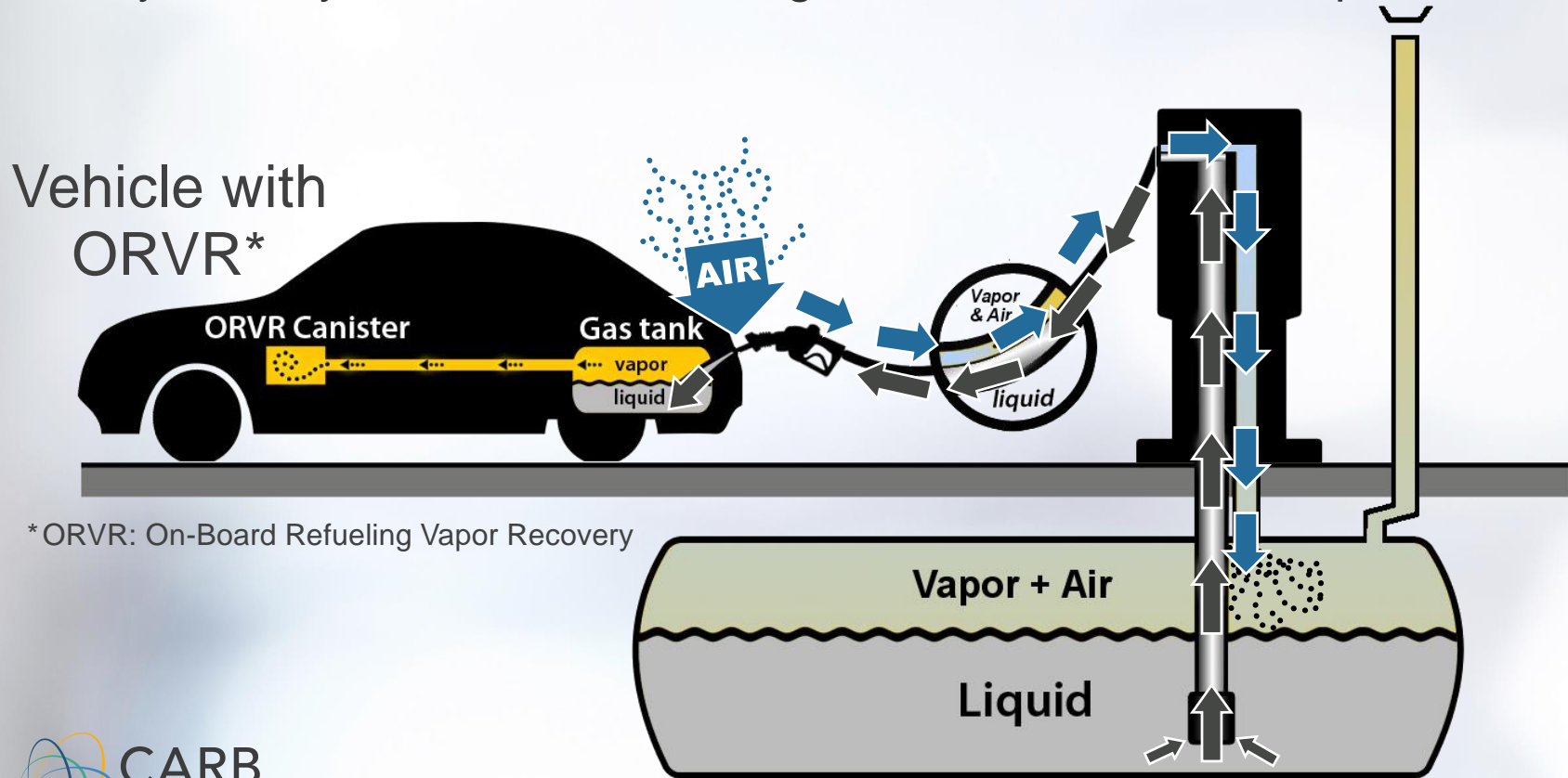
- Primary Causes:
 - High Reid Vapor Pressure (RVP) of winter blend gasoline
 - Excess air ingested due to poor seal at interface between vapor recovery nozzles and newer vehicle fill pipes
- Site-Specific Factors

**Today's
Regulatory
Proposals**

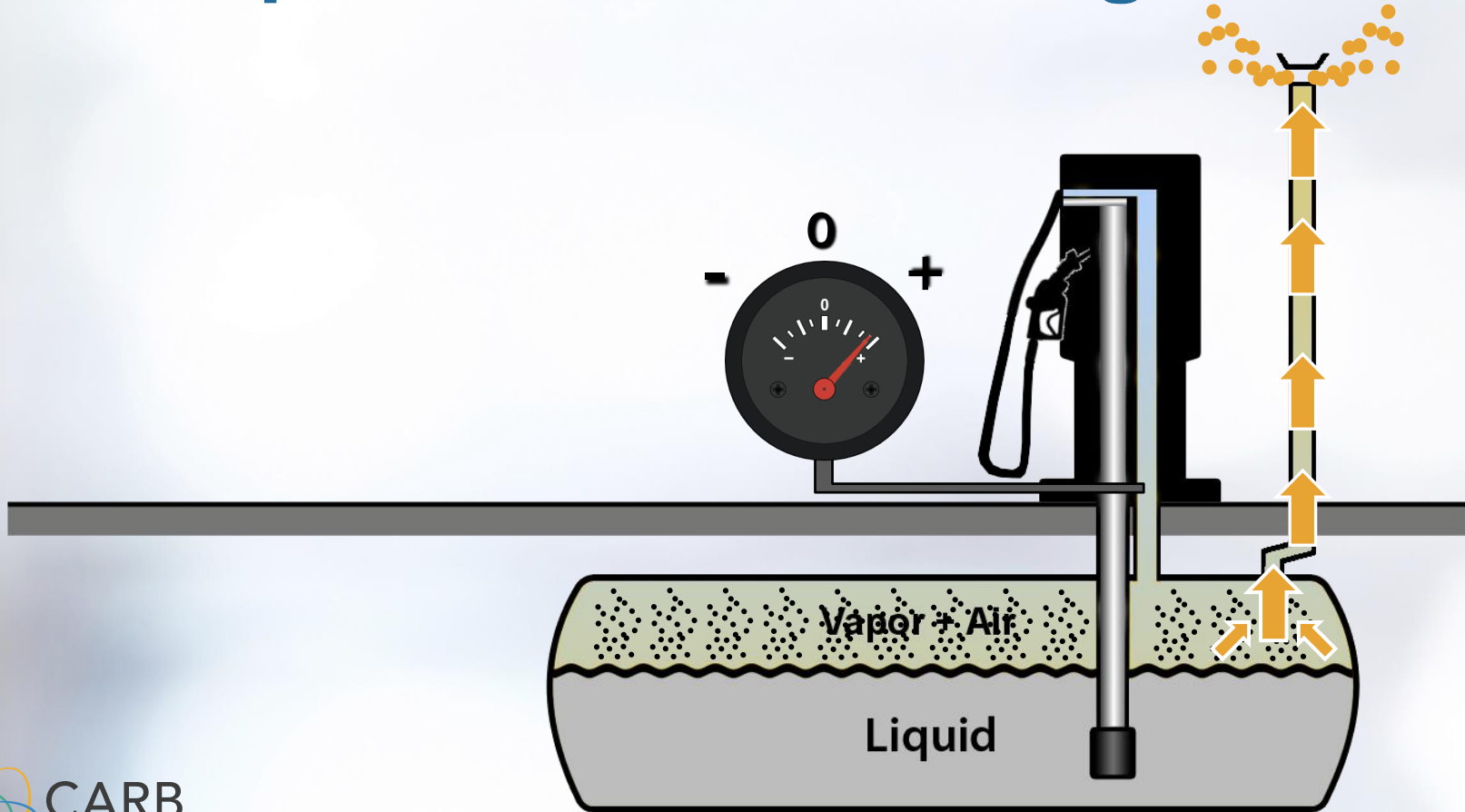


Air Ingestion While Fueling

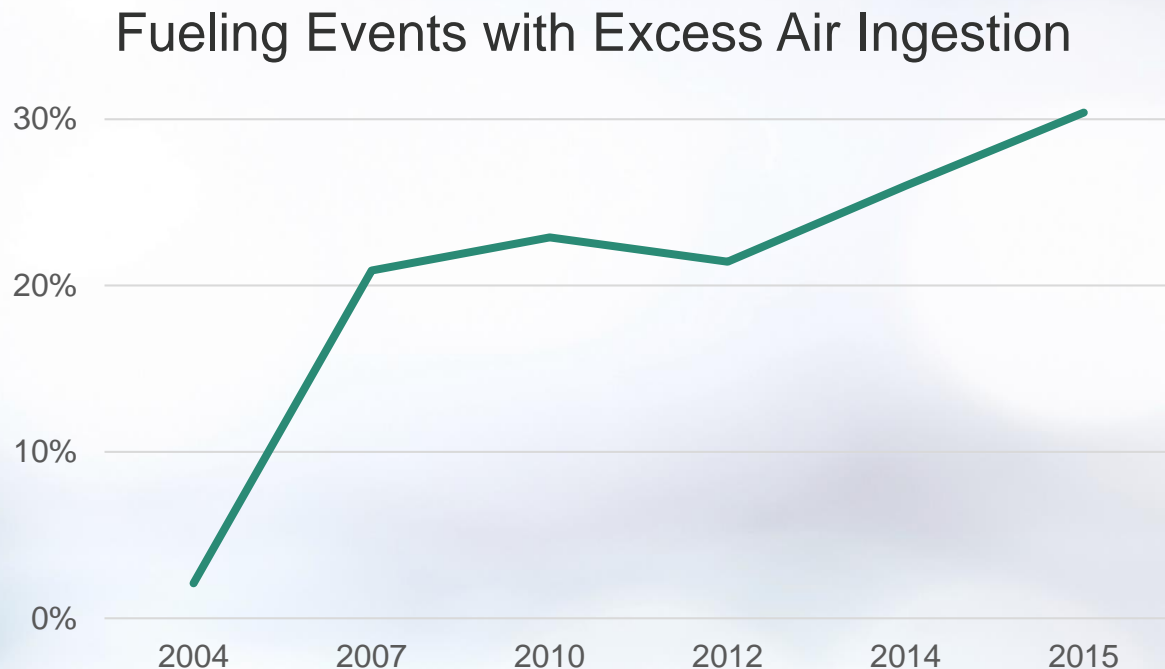
System Dynamics While Fueling with Poor Nozzle/Fill Pipe Seal



Overpressure After Air Ingestion



Increasing Trend in Excess Air Ingestion



Causes of Excess Air Ingestion



1. Capless fill pipes with open drain path



2. Loose Latch

a. Depth of fill pipe locking lip

b. Vapor recovery nozzle design



3. Secondary outer ring (obstructed face seal)

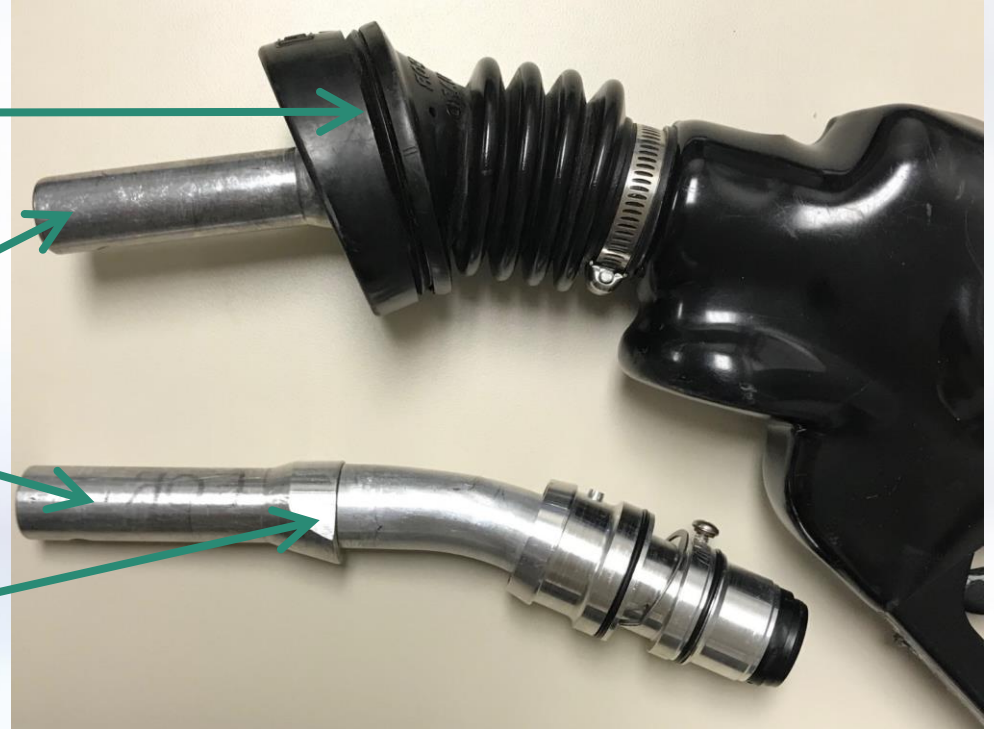


Proposed Dimensions: Key Terms

Nozzle Bellows
(aka boot or interlock device)

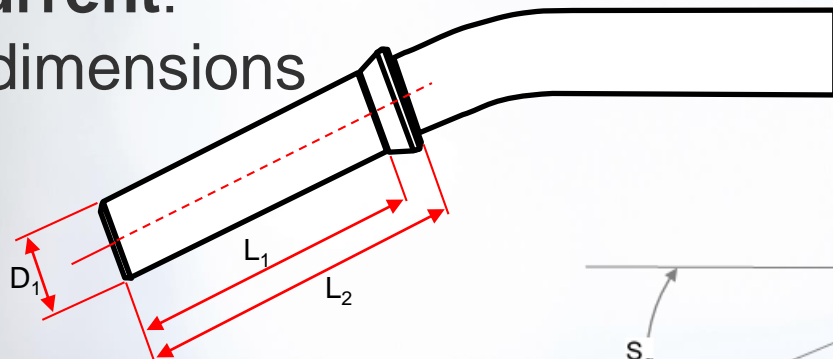
Nozzle Spout

Anchor
(latch ring)

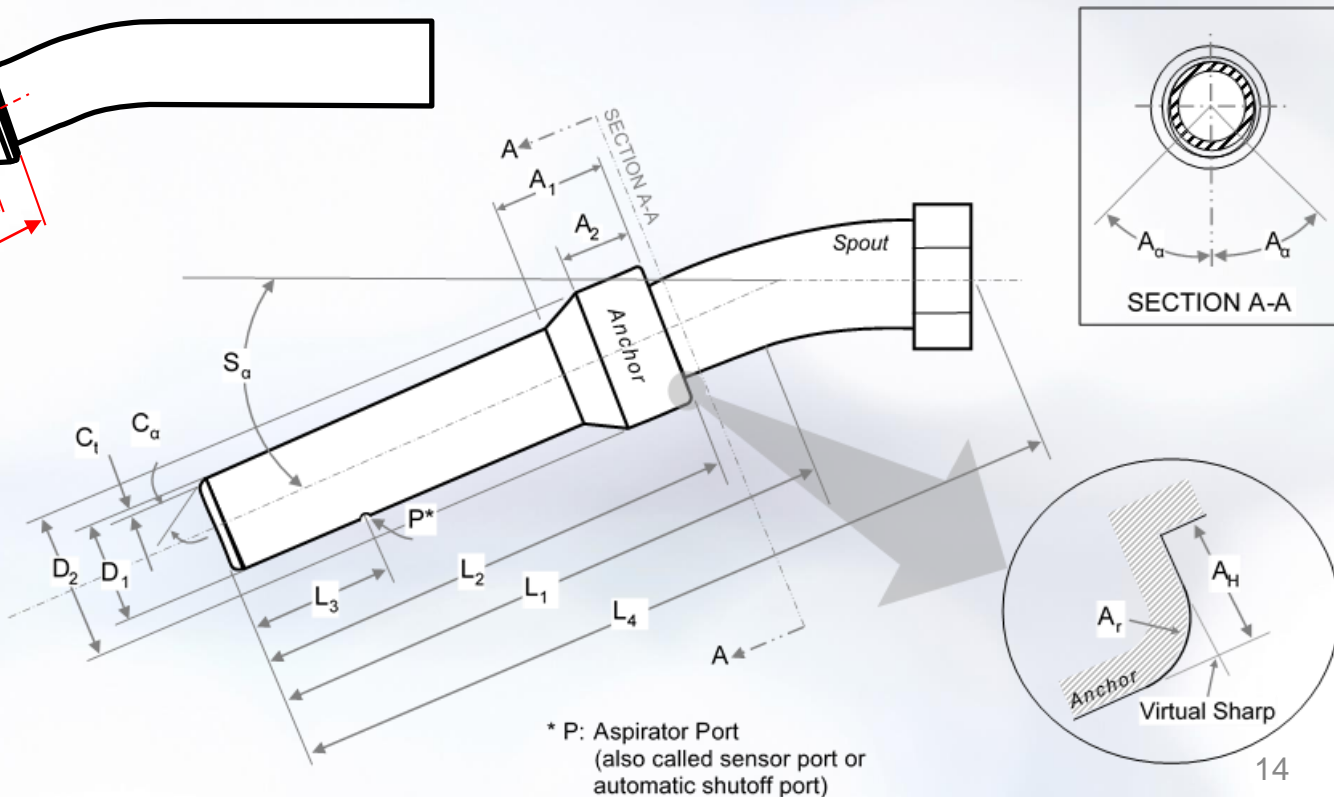


Standardize Nozzle Spout Dimensions

Current:
3 dimensions

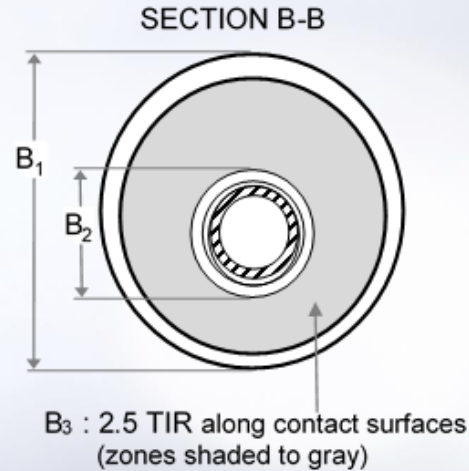
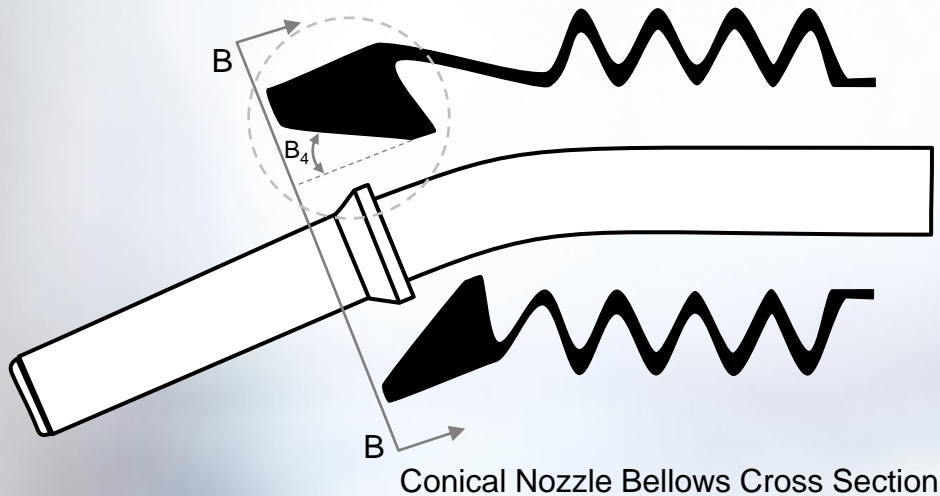


Proposed:
15 dimensions

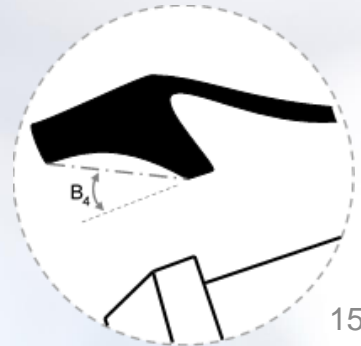


Standardize Nozzle Bellows Dimensions

Proposed:
4 dimensions

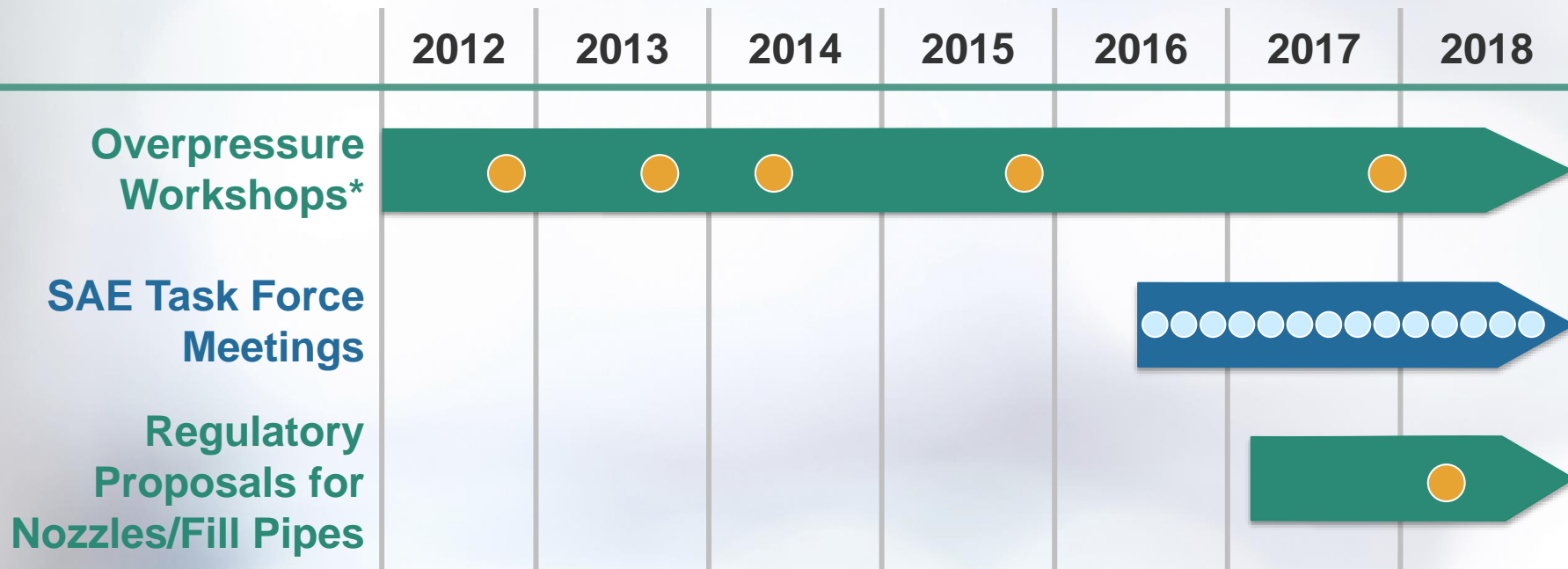


B_4 measurement if bellows is conical/spherical in shape:



Public Process

● Public Workshops



* Workshops for design and planning for field studies, study results, early regulatory proposals

Voluntary Improvements to Vacuum-Assist Nozzle



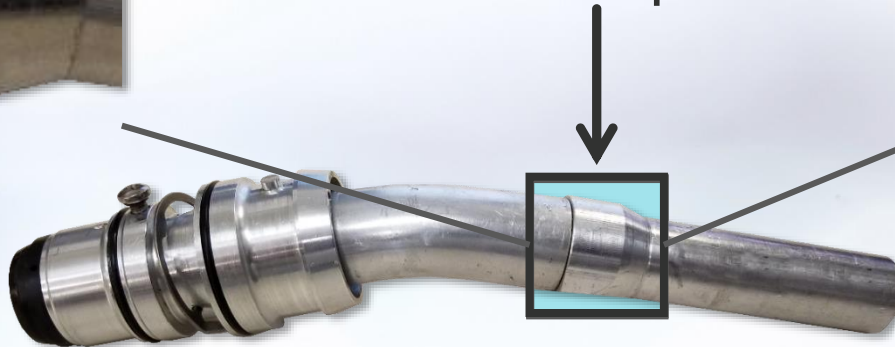
No Longer Manufactured



Improved Latch Ring



Latch Ring on Assist Spout



Benefits of Improved Assist Nozzle

Emission Reductions* Reactive Organic Gas (ROG) and Benzene	Cost Savings for Gas Station Operators with Reduced Frequency of ISD Alarms
~0.94 tons per day (annualized) ~2.85 tons per day (winter)	~\$3.47 million through 2030

* Improved assist nozzle reduces overpressure (OP) alarm frequency and associated emissions, but does not resolve all overpressure concerns. Staff's fill pipe proposal (next Board item) also will help reduce OP alarm frequency and emissions. Future regulatory proposal will address remaining OP factors.

Cost of Proposed Amendments

Include 16 new dimensions in CARB certification process

Increased CARB Certification Costs for Nozzle Manufacturers

~\$20,520 through 2030

If cost passed to gas stations, ~\$2.41 per station*

* Assumes 20% mark-up = $(\$20,520 * 1.2) \div 10,202$ gas stations in California

Staff Recommendations

- Staff recommends that the Board approve today's proposal to standardize gas station nozzle spout dimensions
- Staff will continue working to identify opportunities to address overpressure and reduce ISD alarm frequency

